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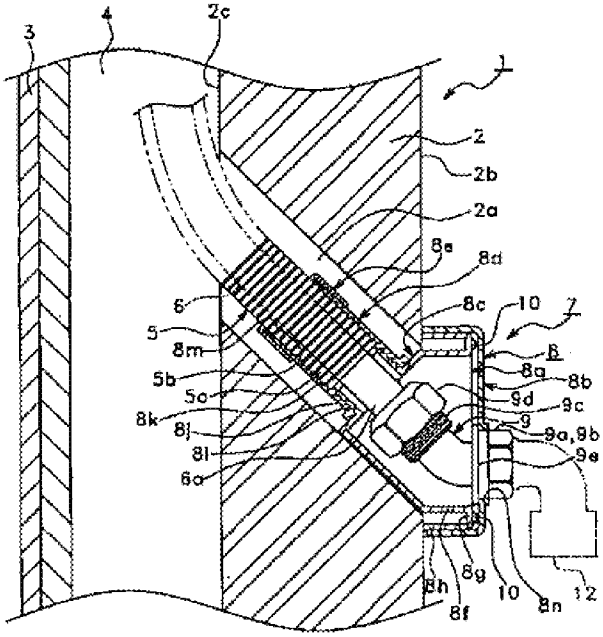
(54) (TITLE OF THE INVENTION) Plumbing Structure and Plumbing Method for Liquid Supply Pipe

(57) (ABSTRACT)

(PROBLEM) To provide a plumbing structure for liquid-supply pipes whereby ingress of rainwater to inside the outer walls can be prevented while providing a passage hole in the outer walls of buildings.

(MEANS FOR SOLVING) A plumbing structure **7** wherein a liquid supply pipe **6** inserted into a sheath tube **5** and plumbed inside an outer wall **2** is made to face toward the outside of the outer wall **2**, which comprises the aforementioned liquid supply pipe **6**, the aforementioned sheath tube **5**, a passage hole **2a**, a liquid supply box **8** and a joint **9**. The passage hole **2a** is formed at an inclination so that it is directed upwards in the eternal wall **2** as it passes from the outer surface **2b** to the inner surface **2c**, thereby making ingress of rainwater difficult. The liquid supply box **8** is attached so that it covers the passage hole **2a** on the outside of the outer wall **2**, and is connected to one end **5a** of the sheath tube **5** via the passage hole **2a**. The joint **9** is housed inside the liquid supply box **8**, and a first connecting nut **9b** on one end of the end **9a** faces toward the outside of the outer wall **2**, whereas the other end **9c** is connected to one end **6a** of the liquid supply pipe **6** by a second connecting nut **9d**.



(SCOPE OF PATENT CLAIMS)

(CLAIM 1) A plumbing structure wherein a flexible liquid supply tube inserted in a flexible sheath tube and plumbed inside an outer wall of a building is made to face toward the outside of said outer wall, said liquid supply tube plumbing structure characterized in that it comprises:

said liquid supply tube;

said sheath tube;

a passage hole that is drilled at an incline in said outer wall so that it is directed upwards as it passes from the outer surface to the inner surface thereof;

a liquid-supply box that is attached to said outer wall so that it covers said passage hole on the outside of said outer wall and also connects to one end of said sheath tube via said passage hole; and

a joint that is housed inside said liquid-supply box, with one end facing toward the outside of said outer wall and the other end disposed on one end of said sheath tube and connected to one end of said liquid supply tube.

(CLAIM 2) The liquid supply tube plumbing structure according to Claim 1, wherein the other end of said liquid supply tube is connected to a branching header that is disposed at a higher level of said building.

(CLAIM 3) A liquid supply tube plumbing method wherein a flexible liquid supply tube inserted in a flexible sheath tube and plumbed inside an outer wall of a building is made to face toward the outside of said outer wall, said liquid supply tube plumbing method characterized in that it:

provides a passage hole that is drilled at an incline in said outer wall so that it is directed upwards as it passes from the outer surface to the inner surface thereof;

pulls, outwards from said outer wall, said sheath tube that has been plumbed inside said outer wall via said passage hole;

connects the box main body of the liquid-supply box that can house the joint to one end of said sheath tube, pushing back said sheath tube into said outer wall, and attaching said box main body to said outer wall so as to cover said passage hole on the outside of said outer wall, then, inserting said liquid supply tube into said sheath tube, while making one end of said liquid supply tube protrude outwards from said outer wall from the front surface of said box main body, positioned to one end of said sheath tube; and

connects said joint to one end of said liquid supply tube, inserting said liquid supply tube into said box main body, and housing said joint inside said liquid-supply box.

(DETAILED DESCRIPTION OF THE INVENTION)

(0001)

(TECHNICAL FIELD OF THE INVENTION) This invention relates to a liquid supply tube plumbing structure and plumbing method, wherein a liquid supply tube that is plumbed inside the outer wall of a building is made to face toward the outside of the outer wall.

(0002)

(PRIOR ART) A conventional plumbing structure in which a liquid supply tube is plumbed along a wall and into the interior of the wall is presented in Japanese Examined Patent Application Publication H6-15912, which provides a double-plumbing structure comprising a sheath tube and a liquid supply tube that inserts into this sheath tube. This plumbing structure **21**, as shown in Fig. 9, is configured from a liquid supply tube **22**, a sheath tube **23**, a passage hole **24a** drilled into a wall **24**, a liquid-supply box **25** and a joint **26**. In this configuration, the passage hole **24a** is drilled in the same direction as the width of the wall **24**, that is, in a direction perpendicular to the wall surface. Thus, the liquid-supply box **25** is situated so that one side **25a** face toward the outside of the wall **24** and the other side **25b** is plumbed along the wall **24** on the inside of the wall **24**. A sheath tube **23** is connected to the other side **25b**. The joint **26** is housed inside the liquid-supply box **25**, where one end **26a** faces toward the outside of the wall **24** and the other end **26b** is connected to the liquid supply tube **22** that has been inserted into the sheath tube **23**.

(0003) When the joint **26** is housed inside the liquid-supply box **25** in this plumbing structure **21**, initially, one end **22a** of the liquid supply tube **22** is pulled outwards from the wall **24** as shown in Fig. 10. Next, the other end **26b** of the joint **26** is connected to one end **22a** of the liquid supply tube **22** that has been pulled out, and the liquid supply tube **22** is then inserted into the liquid supply box **25** and sheath tube **23** so that the joint **26** is housed inside the liquid-supply box **25**.

(0004)

(PROBLEMS TO BE SOLVED BY THE INVENTION) In this connection, when the conventional plumbing structure **21** is utilized for an outer wall, an insertion opening **24a** is drilled in the outer wall, so there is the danger that rain water will enter from outside the building via this passage hole **24a**.

(0005) In addition, when an outer wall is composed of ALC panel (normally having a thickness of about 75 mm to 100 mm) and thus the wall is thick, the liquid supply tube **22** will bend sharply in the region in which it inserts into the passage hole **24a** from the interior of the outer wall. As a result, when the joint **26** is housed inside the liquid-supply box **25**, it will be difficult to carry out the operation in which this liquid supply tube **22** is pulled outwards from the outer wall or inserted into the liquid-supply box **25**, and it is believed that the liquid supply tube **22** could buckle in some cases.

(0006) This invention was designed in order to resolve the above conventional disadvantages, and an objective thereof is to provide a liquid-supply pipe plumbing structure and method whereby ingress of rain water into the outer wall can be prevented in a plumbing structure in which a liquid supply tube is plumbed inside the outer wall of a building and faces toward the outside of this exterior wall.

(0007) Another objective of the present invention is to provide a liquid supply tube plumbing structure and plumbing method whereby, during installation, the liquid supply tube withdrawal and insertion operations whereby the liquid supply tube is pulled outwards from the outer wall or inserted into the liquid-supply box are made easier.

(0008)

(MEANS FOR SOLVING THE PROBLEMS) With the aim of attaining the objectives described above, the liquid-supply pipe plumbing structure and plumbing method pertaining to the present invention have the configurations describe below. Specifically, the liquid supply tube plumbing structure pertaining to the present invention described in

Claim 1 is a plumbing structure in which a flexible liquid supply tube is inserted into a flexible sheath tube and is plumbed inside an outer wall of a building, facing toward the outside of the aforementioned outer wall. The plumbing structure comprises the aforementioned liquid supply tube, the aforementioned sheath tube, a passage hole and a liquid-supply box. The passage hole is drilled at an incline so that it is directed upwards as it passes from the outside to the inside of the aforementioned outer wall. The liquid supply box is attached to the aforementioned outer wall so that it covers the aforementioned passage hole in the outside of the aforementioned outer wall, and is connected to one end of the aforementioned sheath tube via the aforementioned passage hole. The joint is housed in the aforementioned liquid-supply box, and one end faces toward the outside of the aforementioned outer wall, whereas the other end is connected to one end of the aforementioned liquid supply tube that is disposed at one end of the aforementioned sheath tube.

(0009) In this manner, it is possible for liquid to be conducted from outside an outer wall to inside the outer wall and from inside the outer wall to outside the outer wall, because the liquid supply tube that is inserted into the sheath tube and is plumbed inside the outer wall faces toward the outside of the outer wall via a joint that connects to one end of the liquid supply tube through a passage hole that is drilled in the outer wall. At this time, the passage hole is drilled at an incline so that it is directed upwards as it passes from the external surface to the internal surface of the outer wall. Consequently, if rain water should enter into the passage hole, the rain water will be directed downward and will flow towards the outside surface of the outer wall to be discharged outwards. In addition, because the passage hole is drilled at an incline in this manner, the angle at which the inner surface of the outer wall on the upper side of the passage hole meets the passage hole is an obtuse angle. Consequently, the liquid supply tube bends smoothly in the region where it is inserted into the passage hole from inside the outer wall during the operation in which the liquid supply tube is inserted into the liquid-supply box or pulled outwards from the outer wall during connection of the joint to the liquid supply tube when plumbed from the top side of the passage hole. The connection region between one end of the sheath tube and the liquid-supply box may be inside the passage hole or may be outside or inside the wall, having exited the passage hole. Similarly, the connection region between one end of the liquid supply tube and the other end of the joint may be inside the passage hole or may be inside or outside the outer wall, having exited from the passage hole.

(0010) In addition, according to the liquid supply tube plumbing structure of the invention described in Claim 2, the other end of the aforementioned liquid supply tube may be connected to a branching header disposed at a higher level in the aforementioned building. Because the other end of the liquid supply tube is connected to the branching header disposed at a higher level in the building in this manner, the liquid supply tube is conducted through the interior of the outer wall from the top side of the passage hole, and, as described above, the liquid supply tube bends smoothly in the region in which it inserts from the inside of the outer wall into the passage hole in the operation in which the liquid supply tube is pulled out from the outer wall or inserted into the liquid-supply box. In addition, because the other end of the liquid supply tube is connected to the branching header, the liquid that is conducted from outside the outer wall by means of this liquid supply tube is supplied to respective locations as a result branching at the branching header. Conversely, liquid that has been branched at the branching header can be supplied outside the outer wall by means of this liquid supply tube.

(0011) In the invention according to Claim 3, the liquid supply tube plumbing method is a plumbing method in which a flexible liquid supply tube that is inserted into a flexible sheath tube and is plumbed inside the outer wall of the building is plumbed so that it faces toward the outside of the aforementioned outer wall, where plumbing is carried out in the following sequence.

(0012) 1) A passage hole is drilled at an incline so that it is directed upwards as it passes from the outside surface to the inside surface of the aforementioned outer wall.

(0013) 2) One end of the aforementioned sheath tube that is plumbed inside of the aforementioned outer wall is pulled to the outside of the aforementioned outer wall via the aforementioned passage hole.

(0014) 3) The box main body of the liquid-supply box that can house the joint is connected to one end of the aforementioned sheath tube, the aforementioned sheath tube is inserted back into the aforementioned outer wall, and the aforementioned box main body is attached to the aforementioned outer wall so that it covers the aforementioned passage hole on the outside of the aforementioned outer wall.

(0015) 4) The aforementioned liquid supply tube is then inserted into the aforementioned sheath tube, and, along therewith, one end of the aforementioned liquid supply tube that is disposed at one end of the aforementioned sheath tube is pulled out of the aforementioned outer wall from the front surface of the aforementioned box main body.

(0016) 5) The aforementioned joint is connected to one end of the aforementioned liquid supply tube, and the aforementioned liquid supply tube is inserted into the aforementioned box main body so that the joint is housed inside the aforementioned liquid-supply box.

(0017) According to the above plumbing method, the passage hole is drilled at an incline so that it is directed upwards as it passes from the outside to the inside of the outer wall. Should rain water enter into the passage hole, the rain water will flow downwards along the passage hole, that is, to the outside of the outer wall, thus being discharged outwards. In addition, because the passage hole is drilled at an incline in this manner, the passage hole and the inner surface of the outer wall on the upwards side of the passage hole form an obtuse angle. Consequently, when the liquid-supply pipe is plumbed from the top side of the passage hole through the interior of the outer wall, the liquid supply tube bends smoothly in the region in which it inserts from the inside of the outer wall into the insertion hole in the operation in which the liquid supply tube is pulled out from the outer wall or in the operation in which the liquid-supply tube is inserted into the liquid-supply box, in steps (4) and (5) above.

(0018)

(EMBODIMENT OF THE INVENTION) The liquid supply tube plumbing structure and method pertaining to the present invention are described below in reference to the figures.

(0019) Figs. 1 to 8 show embodiments of the liquid supply tube plumbing structure and method pertaining to the present invention. Figs. 1 and 2 show an embodiment of the liquid supply

tube plumbing method, where **1** in the figure is a building, **2** is an outer wall that serves as the outside wall of the building **1**, **3** is an inner wall that serves as the walls of the room interiors, **4** denotes the space in the walls that is formed between the outer wall **2** and internal wall **3**, **5** is a flexible sheath tube, **6** is a flexible liquid supply tube that is inserted into the sheath tube **5**, runs along the outer wall **2** of the building **1**, and is plumbed in the wall interior space **4** on the inside of the outer wall **2**. **7** is the plumbing structure whereby the aforementioned liquid supply tube **6** faces toward the outside of outer wall **2** and consists of the aforementioned liquid supply tube **6**, the aforementioned sheath tube **5**, a passage hole **2a**, a liquid supply box **8** and a joint **9**.

(0020) The wall **2** is composed, for example, of ALC panel with a thickness of from 75 mm to 100 mm. The liquid supply tube **6** is crosslinked polyethylene resin. Although it is flexible, it is relatively rigid, and is thus difficult to bend around sharp curves.

(0021) The passage hole **2a** is drilled at an inclination in a direction that is angled at 45° from the horizontal so that it is directed upwards as it moves from outer surface **2b** to the inner surface **2c** of the outer wall **2**.

(0022) The liquid-supply box **8** is composed of a box main body **8a** and a cover **8b**. In addition, the box main body **8a** is composed of a main body member **8c** that houses the joint **9**, a sheath tube attachment member **8d** into which the sheath tube **5** inserts and a stopper **8e** that stops the inserted sheath tube **5**. The main body member **8c** has a rim-shaped part **8f** that is formed in the shape of a rim so as to house the joint **9**. This rim-shaped part **8f** is disposed such that it lies against the passage hole **2a** and [protrudes out towards] the outside of the outer wall **2**. From the front end of the rim-shaped part **8f** that serves as the outside of the outer wall **2**, a front surface part **8g** is formed that extends so that the front surface profile is in a rectangular shape, bending at a right angle at the external circumference across the entire periphery of the rim-shaped part **8f**. In addition, a side part **8h** is formed that bends at a right angle and extends so that it reaches from the circumferential edge of the front surface part **8g** to the outer surface **2b** of the outer wall **2**. An attachment hole (not shown) is drilled in the front surface part **8g**, and, by means of fixing fixtures **10**, **10** such as screws, the box main body **8a** that contains this main body member **8c** is attached to the outer surface **2b** of the outer wall **2** such that it covers the passage hole **2a** on the outside of the outer wall **2**. In addition, a cylindrical attachment part **8i** that constricts to produce a smaller diameter from the rear end of the rim-shaped part **8f** is formed.

(0023) The sheath tube attachment member **8d** is formed in the shape of a cylinder, and the part to be attached **8j** of the aforementioned end section fits into the attachment part **8i** of the main body member **8c** such that they engage. Thus, from the center to the back end section of the sheath tube attachment member **8d**, a sheath tube insertion part **8k** is produced into which one end **5a** of the sheath tube **5** inserts.

(0024) The stopper **8e** is formed in the shape of a cylinder such that it covers the external circumference of the rear end portion of the sheath tube attachment member **8d**, and is attached to the rear end portion of the sheath tube attachment member **8d** by means of adhesion or press-fitting or the like. The locking fixture **8e** extends such that it is folded backwards to the inside from the sheath tube attachment member **8d**, and fastening protrusions **8m** are formed that protrude towards the center at the extended distal end. The fastening protrusions **8m** fit into grooves **5b** of the sheath tube **5** that has been inserted into the sheath tube attachment member **8d**, and one end **5a** of the sheath tube **5** attaches to the sheath tube attachment member **8d** via the stopper **8e**.

(0025) In addition, the cover **8b** is formed in the shape of a box so as to cover the front surface part **8g** and side part **8h** while blocking the front end side of the rim-shaped part **8f** of the box main body **8a**. Thus, an opening hole **8n** through which a first connection nut **9b** of the joint **9** described below inserts is formed on the front surface of the cover **8b**.

(0026) The liquid-supply box **8** is thus attached to the outer wall **2** such that it covers the passage hole **2a** on the outside of the outer wall **2**, while also connecting to one end **5a** of the sheath tube **5** via the passage hole **2a**.

(0027) The joint **9** has a cylindrical shape with a curved middle section. A first connection nut **9b** used for connection is formed on one end **9a**, and a second connection nut **9d** for connection is similarly provided on the other end **9c**. In addition, a flange part **9e** that extends to both sides thereof is formed on the base end section of the first connection nut **9b**. This joint **9** is housed inside the frame part **8f** of the box main unit **8a** and the flange part **9e** is fixed to the front surface part **8g** of the box main unit **8a** by means of fixing fixtures **11**, **11** such as counter-sink head screws, thereby attaching it to the box main unit **8a**. Thus, the distal end portion of the first connection nut **9b** on one end **9a** of the joint **9** is made to protrude from the opening hole **8n** of the cover **8b**, facing toward the outside of the outer wall **2**. The other end **9c** of the joint **9** connects, by means of a second connection nut **9d**, to one end **6a** of the supply tube **6** that protrudes from the sheath tube **5** situated towards one end **5a** of the sheath tube **5.** In this manner, the liquid supply tube **6** faces toward the outside of the outer wall **2** via the joint **9**, and, for example, an elbow **12** or the like is connected to the first connection nut **9b** of one end **9a** of the joint **9**, thereby leading to lines present on the outside of the outer wall **2**.

(0028) Fig. 3 shows an example of the above plumbing structure in which a branching header is used, and water is supplied to various parts of the building **1**. **13** in the figure denotes the space inside the ceiling between the ceiling of the first floor and the floor of the second floor. **14** denotes a water line external to the room, **15** denotes a branching header, and **16** denotes a hot water heater that is installed outside the room. Regarding the plumbing structures **7**, one is a structure in which a water line **14** outside the room is connected to the branching header **15** that is disposed in the space **13** in the ceiling of the room, and the other is a structure in which the hot water heater **16** outside the room is connected to the branching header **15**. In these plumbing structures **7**, **7**, the liquid supply tubes **6**, **6** are disposed above the passage hole **2a** through the space **4** inside the walls on the inside of the outer wall **2**, and the other ends **6b**, **6b** of the liquid supply tubes **6**, **6** are connected to the branching header **15** that is installed towards the upper level of the building **1**.

(0029) In this manner, water that is supplied from the water line **14** is conducted to the branching header **15** via one plumbing structure **7**, and the water is then branched at the branching header **15** and is conducted to the external hot water heater **16** via another plumbing structure **7**. Next, the hot water exiting the hot water heater **16** is conducted into the room via another plumbing structure **7** not shown in the figures.

(0030) The method for plumbing the liquid supply tube **6** of this plumbing structure **7** will be described next. First, as shown in Fig. 4, a drill **17** is used in order to make a guide hole **2d** that will serve as a guide when forming the passage hole **2a** in the outer wall **2** from the side of the external surface **2b**. When making the guide hole **2d**, first, a guide hole boring support member **18** provided with a guide part **18a** that guides the drill **17** so that it advances in the prescribed direction is fixed to the outer surface **2b** of the outer wall **2** using a fixing fixture **18b** such as a nail. Next,

the guide hole opening support member **18** is removed from the outer wall **2** after making the guide hole **2d**.

(0031) Subsequently, as shown in Fig. 5, a passage hole **2a** is drilled in the outer wall **2** using an ALC core drill **19**. At this point, the ALC core drill **19** is composed of a core drill part **19a** for drilling the passage hole **2a** and a guide drill part **19b** that fits exactly with the guide hole **2d** provided in a region that is farther towards the tip than the core drill part **19a**. The guide drill part **19b** is guided into the guide hole **2d** and the passage hole **2a** is drilled at an incline in the prescribed direction, specifically, in a direction that rises as it passes from the outer surface **2b** to the inner surface **2c** of the outer wall **2**.

(0032) Subsequently, as shown in Fig. 6, one end **5a** of the sheath tube **5** that runs along the outer wall **2** and is plumbed in the wall internal space **4** on the inside of the outer wall **2** in advance is passed through the passage hole **2a** and pulled out from the outer wall **2**. Next, the sheath tube insertion part **8k** of the box main body **8a** is fit onto one end **5a** of the sheath tube **5** that has been pulled out, and the box main body **8a** is thus connected. Then, the box main body **8a** is attached to the outer wall **2** so that it covers the passage hole **2a** on the outside of the outer wall **2** using fixing fixtures **10**, **10** by returning the sheath tube **5** into the outer wall **2** (refer to Fig. 7).

(0033) Next, as shown in Fig. 7, as the liquid supply tube **6** is inserted into the sheath tube **5**, one end **6a** of the liquid supply tube **6** that is disposed on the side of the one end **5a** of the sheath tube **5** is pulled out from the outer wall **2** from the front surface of the box main body **8a**. The other end **9c** of the joint **9** is then connected to one end **6a** of the liquid supply tube **6** using a second connection nut **9d**. In addition, the liquid supply tube **6** is inserted into the aforementioned box main body **8a** so that the joint **9** is housed inside the rim-shaped part **8f** of the box main body **8a**, and the joint **9** is attached to the box main body **8a** using the fixing fixtures **11**, **11** (refer to Fig. 8 and Fig. 2).

(0034) Subsequently, as shown in Fig. 8, the cover **8b** is fitted onto the box main body **8a**. In this manner, the joint **9** is housed inside the liquid-supply box **8**, and the distal end section of the first connection nut **9b** of one end **9a** faces toward the outside of the outer wall **2**, protruding from the opening hole **8n** of the cover **8b** (refer to Fig. 1).

(0035) Next, the plumbing structure **7** for the liquid supply tube **6** having the above configuration and the results of working the plumbing method for the liquid supply tube **6** will be described. The liquid supply tube **6** that is plumbed along with the sheath tube **5** in the wall inner space **4** on the inside of the outer wall **2** faces toward the outside of the outer wall **2** via the passage hole **2a** drilled in the outer wall **2** and via the joint **9** that is connected to one end **6a** of the liquid supply tube **6**. Liquid can thus be conducted from outside the outer wall **2** to the inside or, conversely, can be conducted from the inside of the outer wall **2** to the outside.

(0036) The passage hole **2a** is drilled at an incline such that it is direct upwards as it passes from the outer surface **2b** of the outer wall to the inner surface **2c**. Thus, even if rain water enters into the passage hole **2a**, the rain water will flow downwards along the passage hole **2a**, that is, towards the outer surface **2b** of the outer wall **2**, thereby being discharged outwards. Consequently, even though the passage hole **2a** has been made in the outer wall **2**, rain water can be prevented from entering into the outer wall **2**.

(0037) The passage hole **2a** is drilled at an incline in this manner, and thus the angle between the inner surface **2c** of the outer wall **2** on the upper side of the passage hole **2a** and the passage hole **2a** is an obtuse angle. In the operation in which the liquid supply tube **6** is made to exit outside the outer wall **2** or is inserted into the box main body **8a** of the liquid-supply box **8** when connecting the join **9** to the liquid supply tube **6**, the liquid supply tube **6** that is plumbed from the upper side of the passage hole **2a** through the wall interior space **4** on the inside of the outer wall **2** is gradually curved in the section in which it is inserted from the inside of the outer wall **2** into the passage hole **2a**. Consequently, even if the liquid supply tube **6** is relatively rigid, the operation involving pulling or inserting the liquid supply tube **6** whereby the liquid supply tube **6** is made to exit outside the outer wall **2** or inserted into the box main body **8a** of the liquid-supply box **8** can be made easier.

(0038) In addition, even when the passage hole **2a** is drilled in the same direction as the direction of the width of the outer wall **2**, the effect of facilitating the operation involving pulling or inserting the liquid supply tube **6** can be expected if the diameter of the passage hole **2a** is be increased. However, in this case, the building frame strength of the outer wall **2** or the aesthetics will be impaired. However, as with the plumbing structure **7** pertaining to the present invention, the diameter of the passage hole **2a** can be decreased by drilling the passage hole **2a** at an incline, and there will be no loss of building frame strength of the outer wall **2** or aesthetics in such a case.

(0039) The present invention can be subjected to various modifications within the scope of the above embodiment. For example, the outer wall **2** may be composed of other materials in addition to ALC panels, and the thickness of the outer wall **2** may be thicker or thinner than 75 mm to 100 mm.

(0040) In addition, if the passage hole **2a** is drilled at an incline such that it is directed upwards as it passes from the outer surface **2b** to the inner surface **2c** of the outer wall **2**, this angle may be an angle other than 45°. In addition, the axial center of the passage hole **2a** may be curved in the form of an arc instead of forming a straight line.

(0041) The liquid supply tube **6** that is plumbed inside the outer wall **2** can be connected to a water faucet rather than being connected to the hot water heater **16** or the water line **14** provided on the outside of the outer wall **2** via a joint **9** or the like.

(0042) In addition, the liquid supply tube **6** may be composed of resin materials other than crosslinked polyethylene resin, provided that the material is flexible.

(0043) In addition, if the liquid supply tube **6** is plumbed on the interior of the exterior wall **2**, it may be plumbed so as to run along the exterior wall **2**, or, for example, it may be extended in a direction that is roughly perpendicular to the outer wall **2** and into the outer wall **2** so that it can cut across

the ceiling inner space **13** in Fig. 3 and face toward the outside of the outer wall **2**.

(0044)

(EFFECT OF THE INVENTION) As is clear from the description presented above, the liquid-supply pipe plumbing structure and method pertaining to the present invention has the following effects.

(0045) By means of the liquid supply tube plumbing structure according to Claim 1 having a plumbing structure in which the liquid supply tube that is plumbed on the inside of the outer wall of a building is made to face toward the outside of the outer wall, even if rain water enters into the passage hole, the rain water will flow through the passage and be discharged outwards from the outer wall. Consequently, ingress of rain water inside the outer wall can be prevented.

(0046) In addition, by means of the liquid supply tube plumbing structure according to Claim 2, in operation involving pulling and inserting the liquid supply tube whereby the liquid supply tube is pulled outward from the exterior wall during installation or the tube is inserted into the liquid-supply box, the liquid supply tube bends smoothly in the section in which it is inserted into the passage hole from inside the exterior wall, so the liquid supply tube pulling and insertion operations can be facilitated.

(0047) By means of the liquid supply tube plumbing structure and plumbing method according to Claim 3, in the plumbing method in which the liquid-supply tube that is plumbed on the interior of the exterior wall of a building is made to face toward the outside of the outer wall, even if rainwater enters into the passage hole, the rainwater will flow through the passage hole and be discharged outside the outer wall, thereby making it possible to prevent the rain water from entering into the exterior wall. In addition, when the liquid supply tube is plumbed from the upper side of the passage hole through the interior of the exterior wall, in the operation involving pulling and inserting the liquid supply tube whereby the liquid supply tube is made to exit outside the outer wall or is inserted into the liquid-supply box, the liquid supply tube curves gradually in the section in which it inserts from the inside of the exterior wall into the passage hole, and thus the operation involving pulling and insertion of the liquid supply tube can be facilitated.

(BRIEF DESCRIPTION OF THE DRAWINGS)

(Fig. 1) Sectional view of an embodiment of the liquid supply tube plumbing structure and method pertaining to the present invention.

(Fig. 2) Exploded plan view of the same showing the condition in which the cover has been removed.

(Fig. 3) Sectional view of the same showing the structure of the sheath tube header.

(Fig. 4) First sectional view for describing the sequence of the liquid supply tube plumbing method.

(Fig. 5) Second sectional view for describing the sequence of the liquid supply tube plumbing method.

(Fig. 6) Third sectional view for describing the sequence of the liquid supply tube plumbing method.

(Fig. 7) Fourth sectional view for describing the sequence of the liquid supply tube plumbing method.

(Fig. 8) Fifth sectional view for describing the sequence of the liquid supply tube plumbing method.

(Fig. 9) Sectional view showing a conventional liquid supply tube plumbing structure.

(Fig. 10) Sectional view showing a conventional liquid supply tube plumbing method.

(EXPLANATION OF REFERENCES)

1	Building
2	Outer wall
2a	Passage hole
2b	Outer surface
2c	Inner surface
5	Sheath tube
5a	One end
6	Liquid supply tube
6a	One end
6b	Other end
7	Plumbing structure
8	Liquid-supply box
8a	Box main body
9	Joint
9a	One end
9c	Other end
15	Branching header

Figure 2

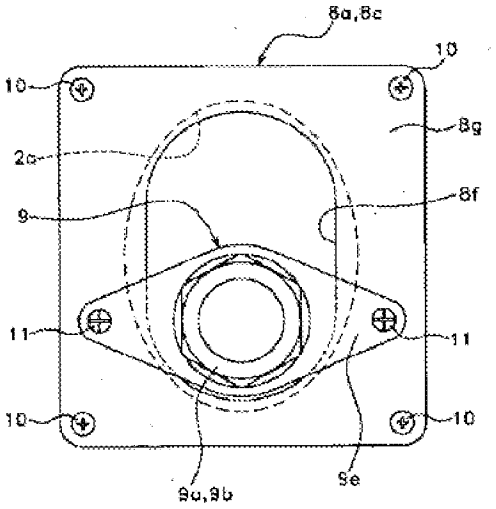


Figure 4

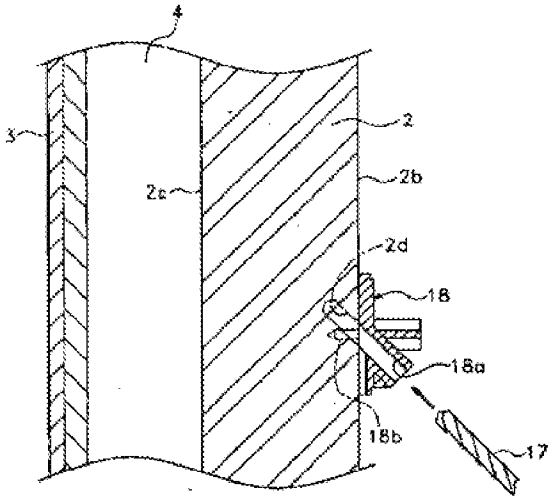


Figure 1

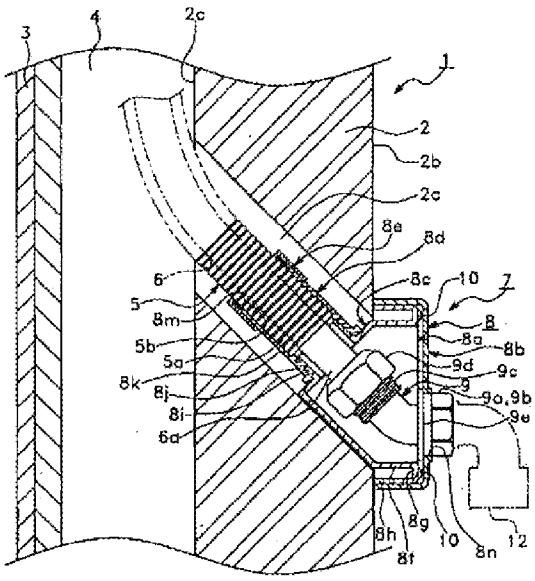


Figure 3

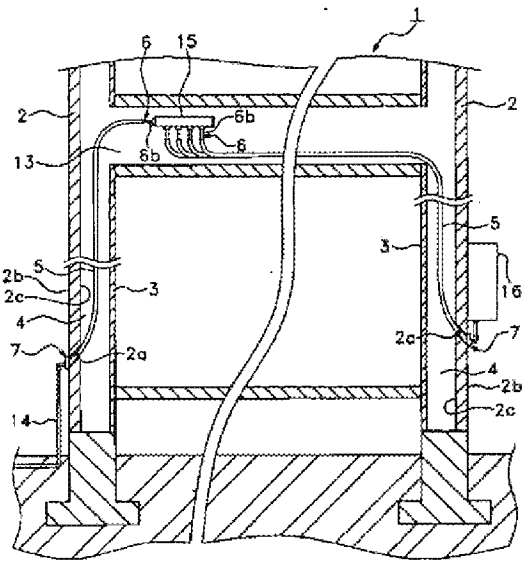


Figure 5

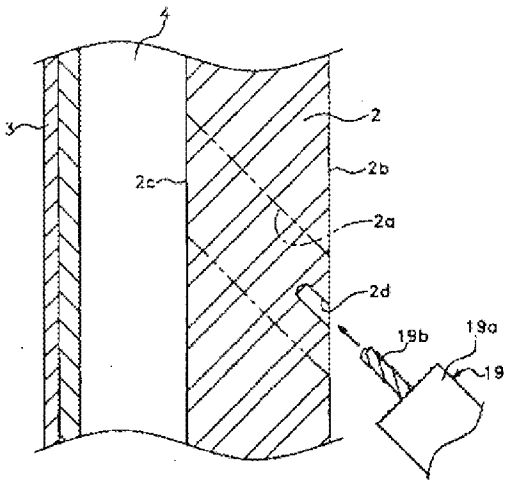


Figure 6

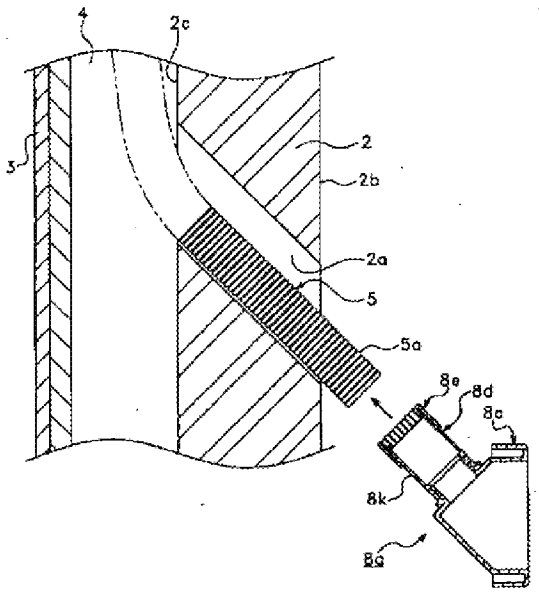


Figure 7

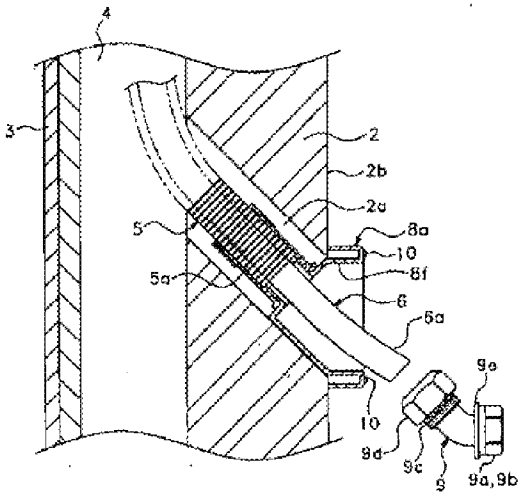


Figure 8

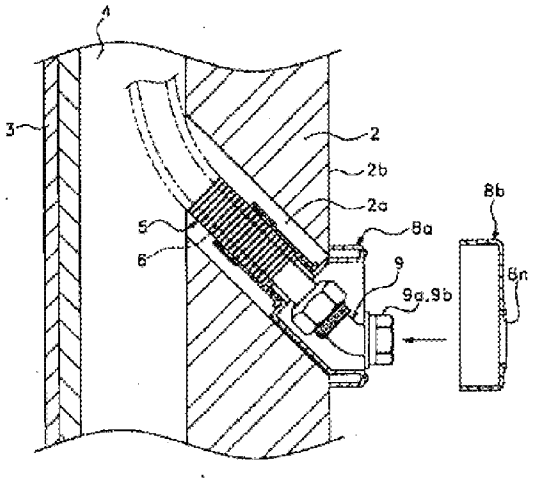


Figure 9

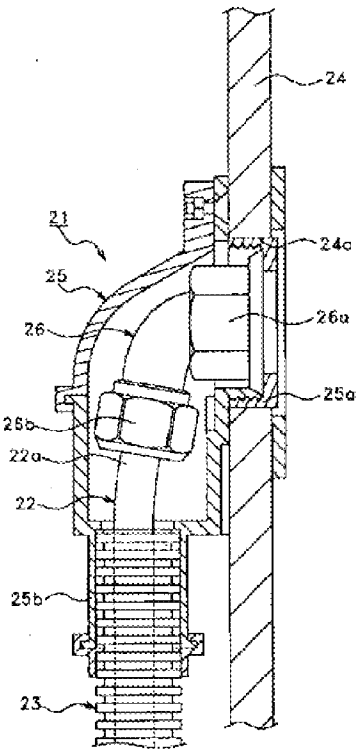


Figure 10